

Third Quarter Exam Review Sheet  
AP Physics

1. Waves:

- a. Variables (units): Amplitude (m), period (s), frequency (Hertz: Hz), angular frequency (radians per second: rad/s), velocity (m/s).
- b. Types:
  - i. Transverse.
  - ii. Longitudinal.
- c. Polarization.
- d. Inverse-square law, and intensities of waves.
- e. Standing Waves:
  - i. Creating of standing waves, and what nodes and antinodes are.
  - ii. Standing waves on a string.
  - iii. Standing waves in an open/open pipe or an open/closed pipe, and the wavelength and frequency of each.
- f. Superposition.
- g. Equations.

2. Geometric Optics:

- a. Reflection and Refraction:
  - i. Snell's Law.
  - ii. Total internal reflection, and under what conditions it occurs.
  - iii. Equations.
- b. Mirrors:
  - i. Types:
    - 1. Plane.
    - 2. Convex.
    - 3. Concave.
  - ii. Ray tracing to find image: real or virtual, upright or inverted, magnified or reduced.
  - iii. Equations.
- c. Lenses:
  - i. Types:
    - 1. Converging.
    - 2. Diverging.
  - ii. Ray tracing to find image: real or virtual, upright or inverted, magnified or reduced.
  - iii. Changing focal length by changing properties of lens.
  - iv. Equations.

3. Physical Optics:

- a. Diffraction: How waves spread depending on width of slit and wavelength.
- b. Interference:
  - i. Constructive: Integer wavelengths.
  - ii. Destructive: Half-integer wavelengths.
  - iii. Single-Slit Interference:
    - 1. Pattern on screen.

- 2. Equations.
- iv. Double-Slit Interference:
  - 1. Young's experiment.
  - 2. Pattern on screen.
  - 3. Equations.
- v. Multiple-Slit Interference (Diffraction Grating):
  - 1. Pattern on screen.
  - 2. Equations.
- 4. Electromagnetic Spectrum:
  - a. Names.
  - b. Relationship between wavelength and frequency.
- 5. Atomic Physics:
  - a. Wave-particle duality: Experiments that determined principle.
  - b. Blackbody radiation.
  - c. Emission and absorption spectra.
  - d. Photons and the photoelectric effect.
  - e. Momentum of a photon.
  - f. de Broglie wavelengths.
  - g. Equations determining energy, wavelength, frequency, and momentum for particles with mass and photons.
- 6. Nuclear Physics:
  - a. Rutherford scattering and Bohr model.
  - b. Nucleons and letters denoting each kind.
  - c. Forces: Strong nuclear and weak nuclear.
  - d. Radioactivity:
    - i. Alpha.
    - ii. Beta.
    - iii. Gamma.
    - iv. How each are created.
    - v. Energy of each.
    - vi. Decay of products of radioactive material.
    - vii. Be able to complete decay reactions based on alpha, beta-plus, and beta-minus types.
  - e. Induced nuclear reactions.
  - f. Fission.
  - g. Fusion.